

CosiMate Top Use Cases

Multiphysics Software by Chiastek

Cyber-physical MBD for Multiphysics Automotive Systems

Challenge

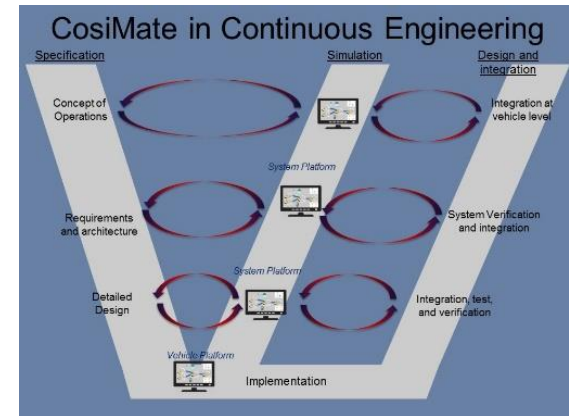
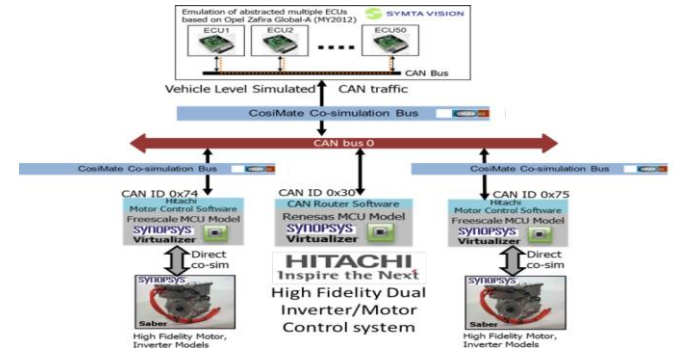
- Traditional design methodologies find it difficult to cope when fundamental hardware problems are identified late in the development process, during the validation phase. The MBD approach is one possible solution to these issues and it lays the foundation for CPSs.

Solution

- Implementation of Multiphysics in MBD

Results

- This virtual implementation methodology is exhaustive to potentially support a vehicle level simulation that would enable component, system and vehicle level software development very early in the design phase and drastically reduce the overall development time for the vehicle.



Multiphysics Co-simulation for a Wide Band Gap Power Module Fatigue-Related Performance Assessment

Challenge

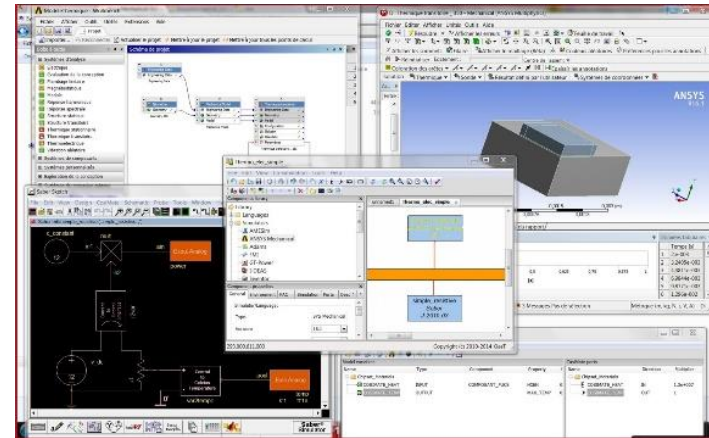
- To optimize the resources usage and have a relevant representation of the problem

Solution

- A 1D electrical / 3D thermal / 3D mechanical coupled method implemented over a co-simulation bus
- Different time steps, different abstraction levels and different skills shall be used to provide predictions of the multiphysical fatigue behavior of power modules.

Results

- Ability to investigate a vast number of failure scenarios at the lowest cost



Electric Mobility: Explore Energy Efficient Solutions

Challenge

- Usage of waste, heat and power loss due to electromagnetic issues

Solution

- Coupling & collaboration enables efficient usage of design in experiment

Results

- Faster time to market
- Reliable designs
- Few prototypes
- Better products/solutions

Electrical-Electromagnetic Co-simulation

Challenge

- Use of simulation to assess performances of an electrical machine.

Solution

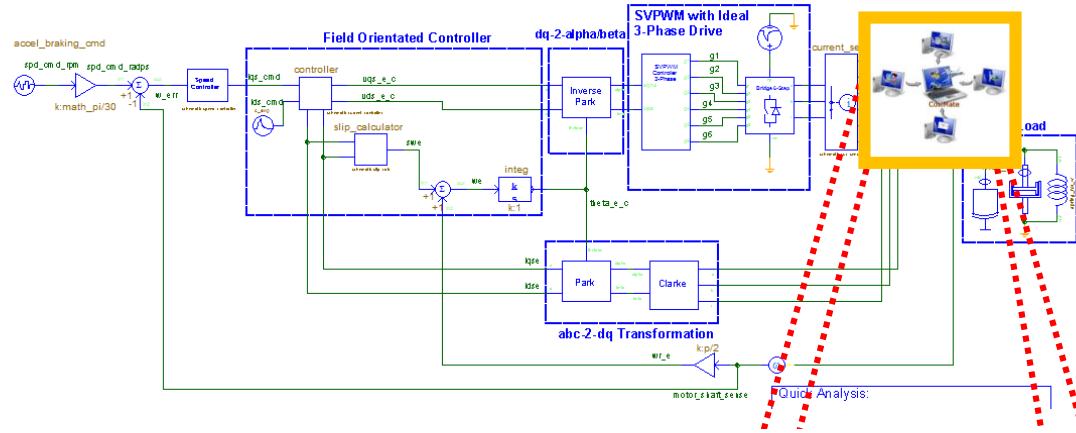
The simulation of the system must be as accurate as possible to represent:

- Control laws
- The electrical machine (torque and energy efficiency)
- The inverter
 - Techno of the power switch
 - Guarantee of thermal behavior
 - Impact of electromagnetic perturbations
- Overall electrical architecture design
 - Due respect of low voltage network quality

Results

- CosiMate allows to implement a coupled analysis including an accurate simulation of the inverter (Saber) and an FEM description of the Permanent magnet synchronous machine (Flux).
- It is then possible to easily validate scenarios and optimization strategy (System sizing)

Electrical-Electromagnetic Co-simulation Cont.



Ensemble mécanique / Vitesse de rotation [ROTOR]

